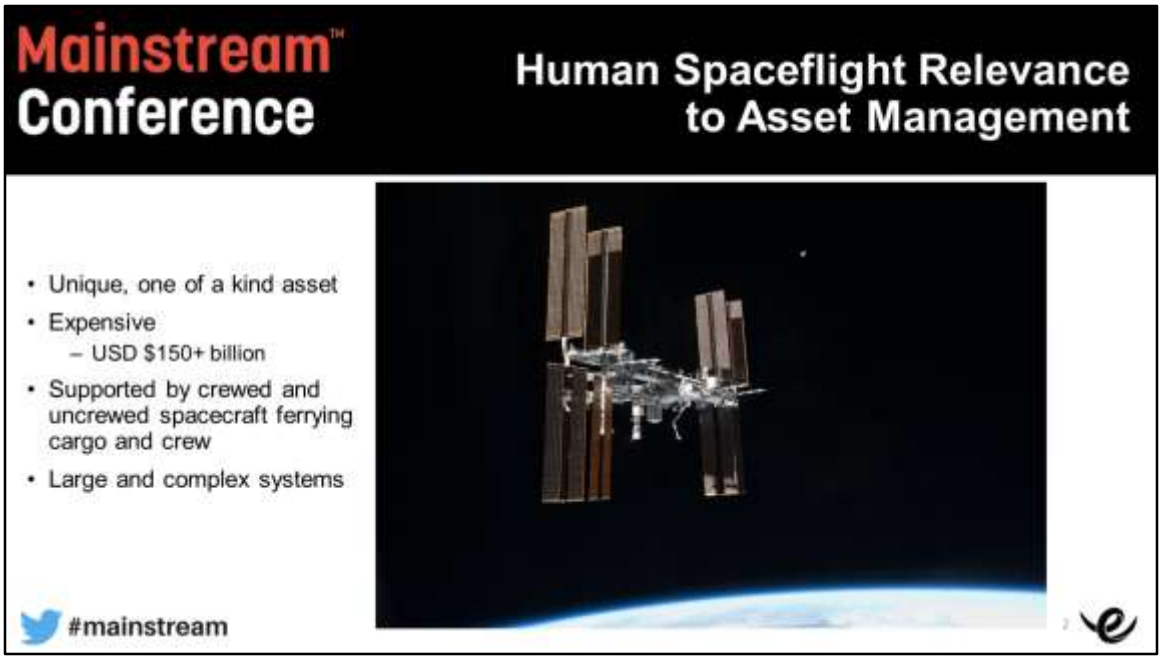
Presentation PET 0:00
40 minutes max for talking, leaving 10 minutes for Q&A.



Duration: 1:00
PET: 1:00
How is NASA and the space station relevant at an Asset Management conference? These first few slides are meant to both explain a bit more about ISS but also highlight that there are several similarities to the industries and companies represented at Mainstream. This piece is really a "why you should listen to me" piece.

See if this sounds familiar –
The Space Station is a large, unique, and expensive asset that is supported by people and resources from all over the world
Space Station exists to generate profit that's only capable of being created by this unique off-planet asset. In our case, profit does not mean financial profit but rather the generation of new, ground breaking research results that will benefit life on Earth and also assist us in the pursuit of sending people beyond Earth for long durations.

Duration: 2:00
PET: 3:00

A little more detail and information about our asset.

Duration: 4:00
PET: 7:00

Video runs 2:47
Our remote asset wasn't put into Earth orbit as a single unit. We had to build all the pieces at contractor and sub-contractor locations all around the world. Then we had to get that hardware to one of a few launch sites, put them into low Earth orbit, and assemble the space station in orbit. Many of the pieces were not able to be test-fit together on Earth, they came together for the first time in space.
YouTube URL for this movie: https://youtu.be/_OqL_GEML64
Music is free use from http://www.bensound.com.
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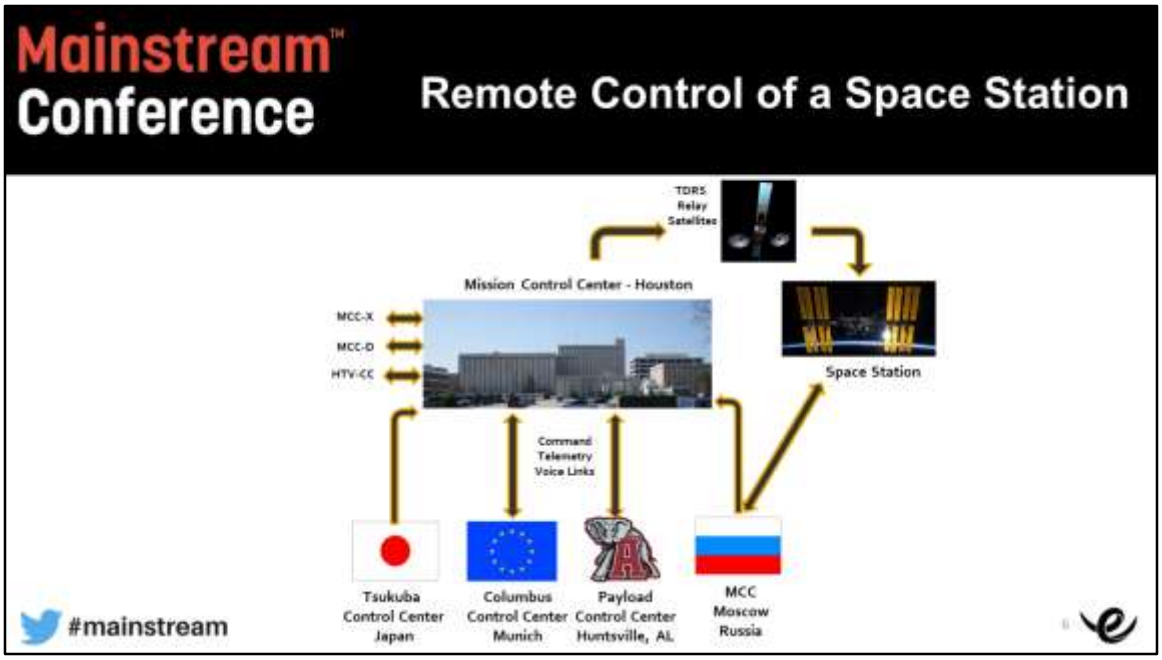
Duration: 2:00
PET: 9:00

Multiple launch sites, multiple contractors, 5 mission controls – definitely a global mission and global partnership



Duration: 3:00
PET: 12:00

5 control rooms support Space Station – in Germany, Russia, Japan, and 2 in the US. Each is responsible for its own country's components. In the US, we have 1 control center responsible for the US modules to keep them running and keep the crew alive. That's what we do in Houston. The other US control center in Huntsville, Alabama, is responsible for all of NASA research and experiments. They work with the crew to accomplish the science while in Houston we keep the lights on and the crew breathing.

Focusing a bit more on MCC-Houston, a little more detail about how nearly everything funnels into/through/from Houston to get to the ISS. Yet we also have dissimilar redundancy via MCC-Moscow.

Duration: 2:00
PET: 14:00

Houston is also the Lead Control Center – the buck stops at the Houston Flight Director. Houston Flight is the final authority for real-time operations.
Also describe a bit about how the room works, how the various consoles are responsible for different aspects of the mission, all funneling into Flight.

Mainstream™ Conference

Human Spaceflight and Asset Management

- Remote Location
  - 400 km straight up
  - Spare parts are sometimes hard to come by
  - Repair, including shutdowns and turnarounds, can mean conducting one or more dangerous spacewalks

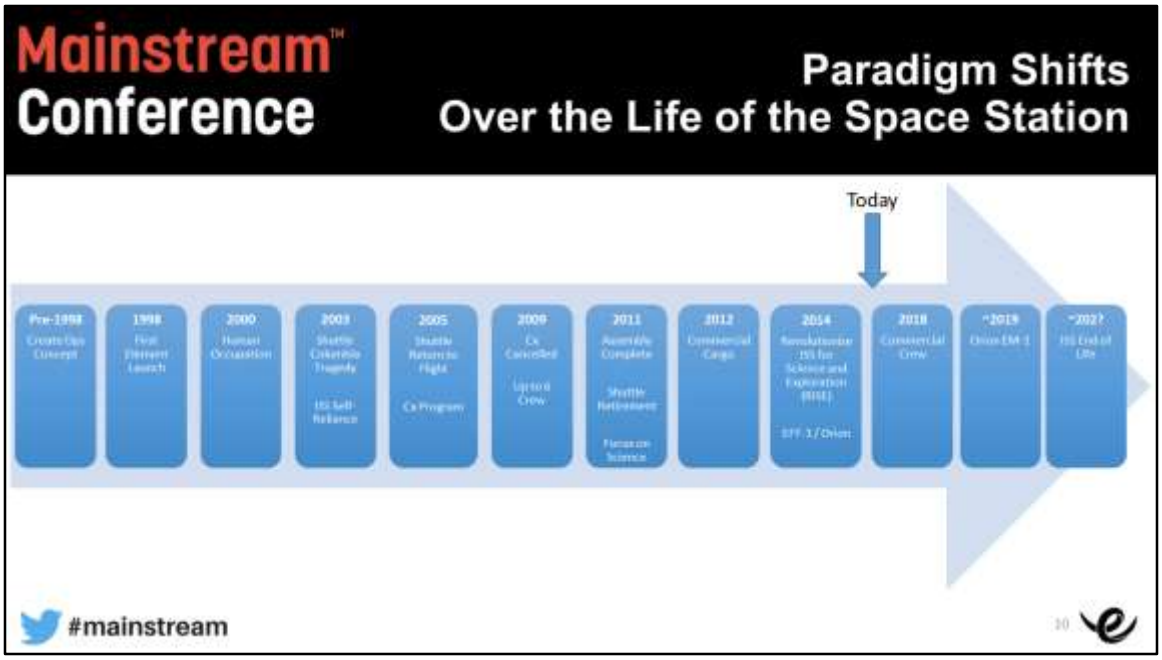
#mainstream

Duration: 1:00
PET: 15:00

No such thing as a complete shutdown. Repairs must always be conducted while ensuring the Station can keep the crew alive and safe. Safety is always our number one priority.

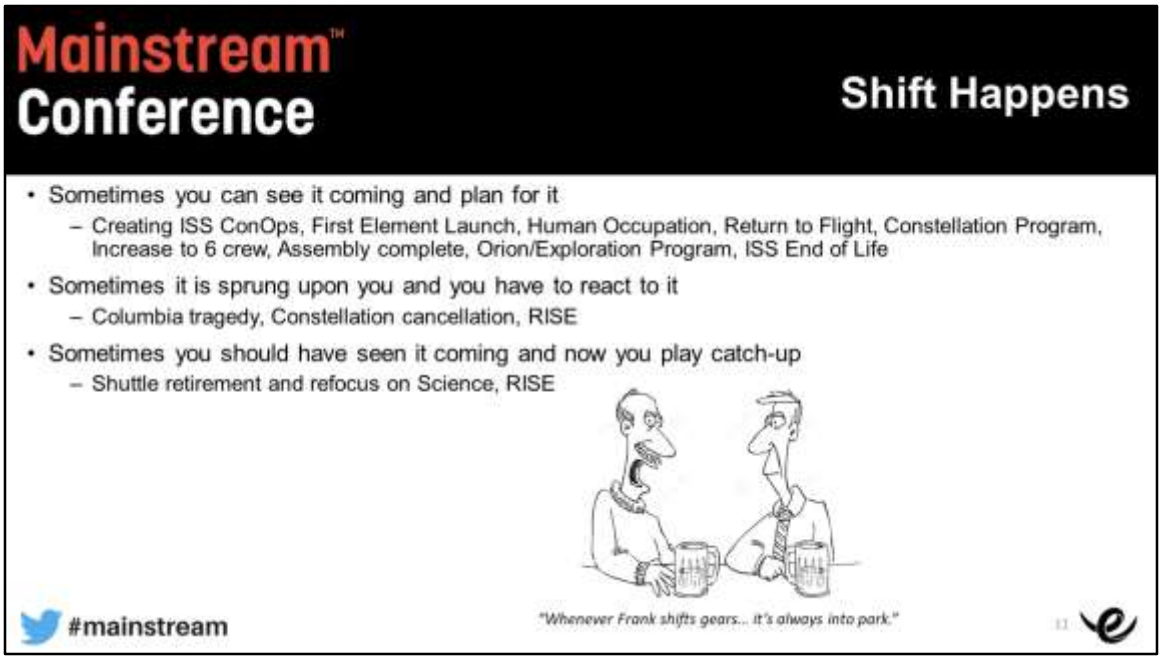
Duration: 4:00
PET: 19:00

Video source: https://youtu.be/gv4sOEXrxtQ
Duration: 3:35
Do these situations strike you as similar to the environment you deal with in your industries? From my experience with Mainstream and other asset management conversations, I think we have a lot in common and a lot we can learn from each other.



Duration: 5:00
PET: 24:00

Space Station has been in orbit since 1998, crew-tended since 2000. It's probably no surprise to you that the mission we started with in 1998, the mission we thought we'd be flying for decades, is nowhere near where we are today. Things have changed. Sometimes we saw the change coming and sometimes we didn't. The same is true for your industries – sometimes you see the paradigms shifting and you try to prepare for them. Sometimes they hit you square in the face and you just have to react. Sometimes they happen and it's only after the fact – maybe years later – you realize what's happened or that you missed an opportunity and your only choice is to scramble to recover.
Here are just a few of the paradigm shifts that have happened since the space station has been in orbit.



Duration: 2:00
PET: 26:00

We're not perfect and not here to say we are. As much as we try to look ahead and prepare for everything, sometimes we get caught off guard. Sometimes we're so focused on paradigm shifts that we know are coming we stop looking for the unanticipated changes and get caught off guard.

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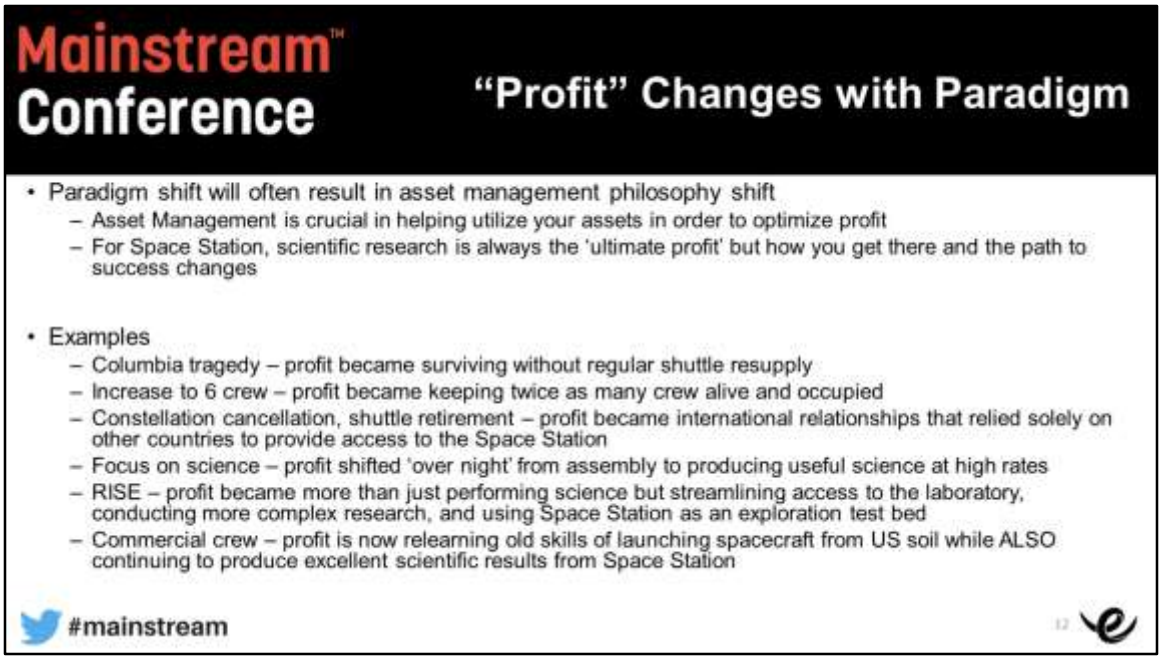


Duration: 3:00
PET: 29:00

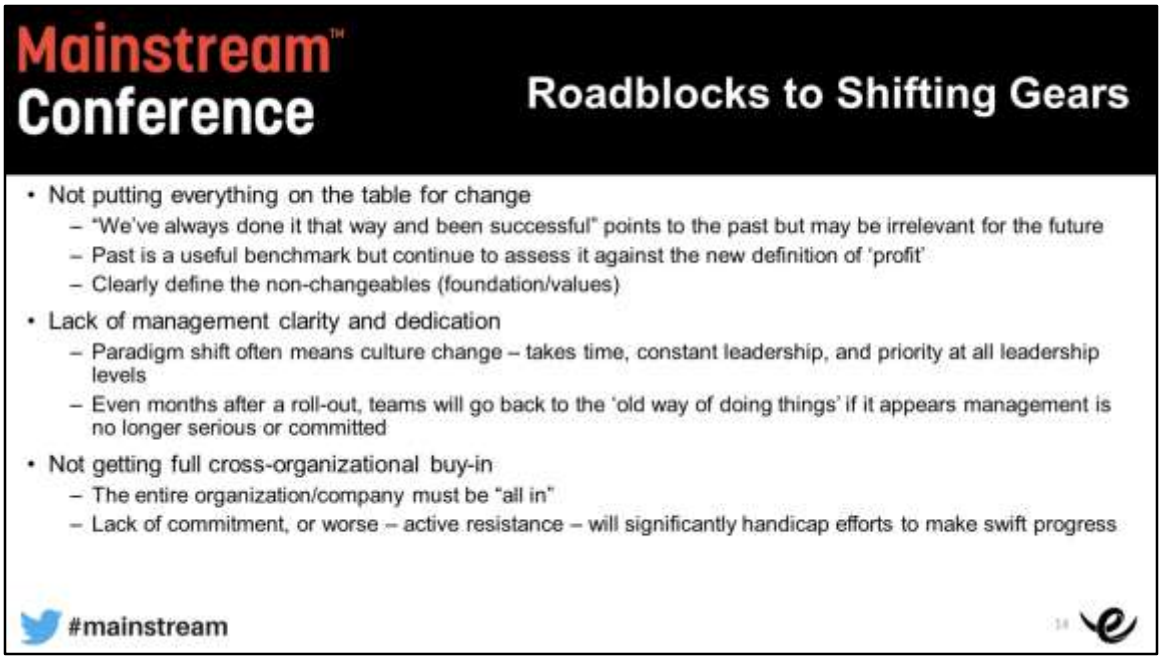
As you adjust processes, techniques, and approaches with a paradigm shift, be sure to stop and assess your definition of 'profit.' Did it change too?

Duration: 3:00
PET: 32:00

FOD has had to shift and change over time as the profit/end-game has shifted. While we shift and change, there are some things we work incredibly hard to ensure never change (Foundations, Core Values). We're also regularly seeking clarity on what's currently our "profit." For our organization, there can be multiple 'profits' at once – for ISS it's research, for commercial crew it's contract success (financial profit), for Orion & Exploration – it's enabling beyond Earth missions.

ISS Examples

Shift Duty Officer to ACE flight controllers to GEMINI flight controllers to Operator/Specialist/Instructor



Duration: 3:00
PET: 35:00

Not putting everything on the table for change

"We've always done it that way and been successful" points to the past but may be irrelevant for the future

Past is a useful benchmark but continue to assess it against the new definition of 'profit'

Clearly define the non-changeables (foundation/values)

Lack of management clarity and dedication

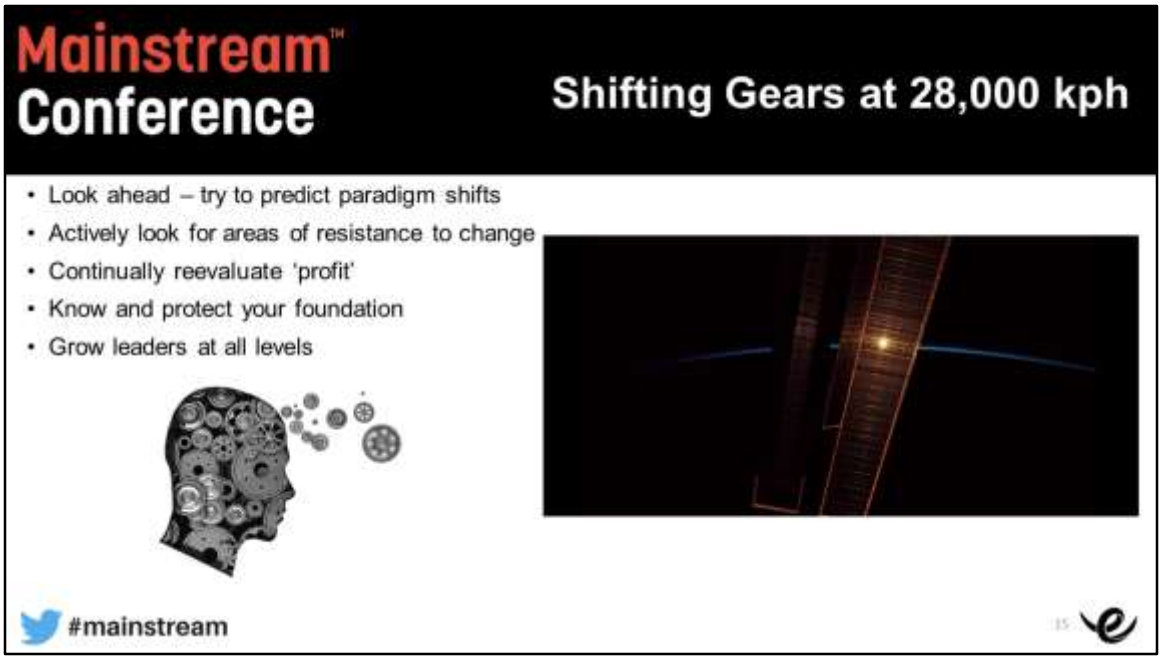
Paradigm shift often means culture change – takes time, constant leadership, and priority at all leadership levels

Even months after a roll-out, teams will go back to the 'old way of doing things' if it appears management is no longer serious or committed

Not getting full cross-organizational buy-in

The entire organization/company must be "all in"

Lack of commitment, or worse – active resistance – will significantly handicap efforts to make swift progress



Duration: 3:00
PET: 38:00

Look ahead – try to predict paradigm shifts

Strategize on potential failures that could drive unforeseen changes

Example: stand down on Space Shuttle flights for multiple years

Continually reevaluate 'profit'

If you're producing a lot of something but that something is no longer needed then you're really just producing waste and not profiting

Will current techniques, processes, strategies work to produce the new 'profit?' Let the answer to this question drive process/technique changes

Expect to change your asset management philosophies to keep up with a change in 'profit' definition

Know your foundation

What values are unalterable?

Winds of changing paradigms can blow you all over the place. Establish in advance the things/values that you will not alter even as profit changes over time

Grow leaders at all levels

Engage those leaders in development of the paradigm shifts and engage them in committing to their implementation

Actively look for areas of resistance to change

Do not assume ‘they will get onboard’

Make sure everyone understands the reason and motivation for the change

Make leadership changes if necessary

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